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B01D

(54) **Water treatment**

(57) Water for human consumption is passed through a filter element 9 and then through ultra-violet irradiator 2. A normally closed solenoid-operated valve 17 has in its control circuit a micro-switch 15 which is operated by the proximity of a magnetic element 13, whose position depends on the presence or absence of filter element 9 in its casing. so that if the filter element is omitted the valve 17 cannot be opened, and no water will be delivered to the consumer unfiltered. A non-return valve 20 in the filter casing inlet similarly actuates a second switch to activate the irradiator 2 and booster pump 3 only when water is flowing.

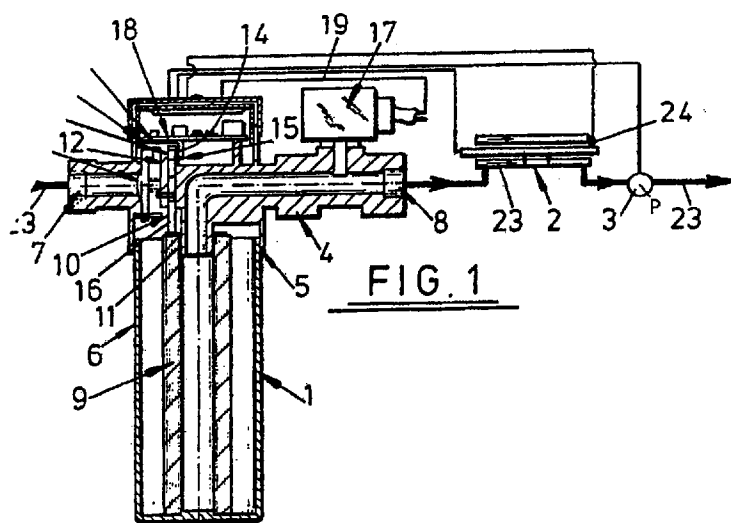


FIG. 1

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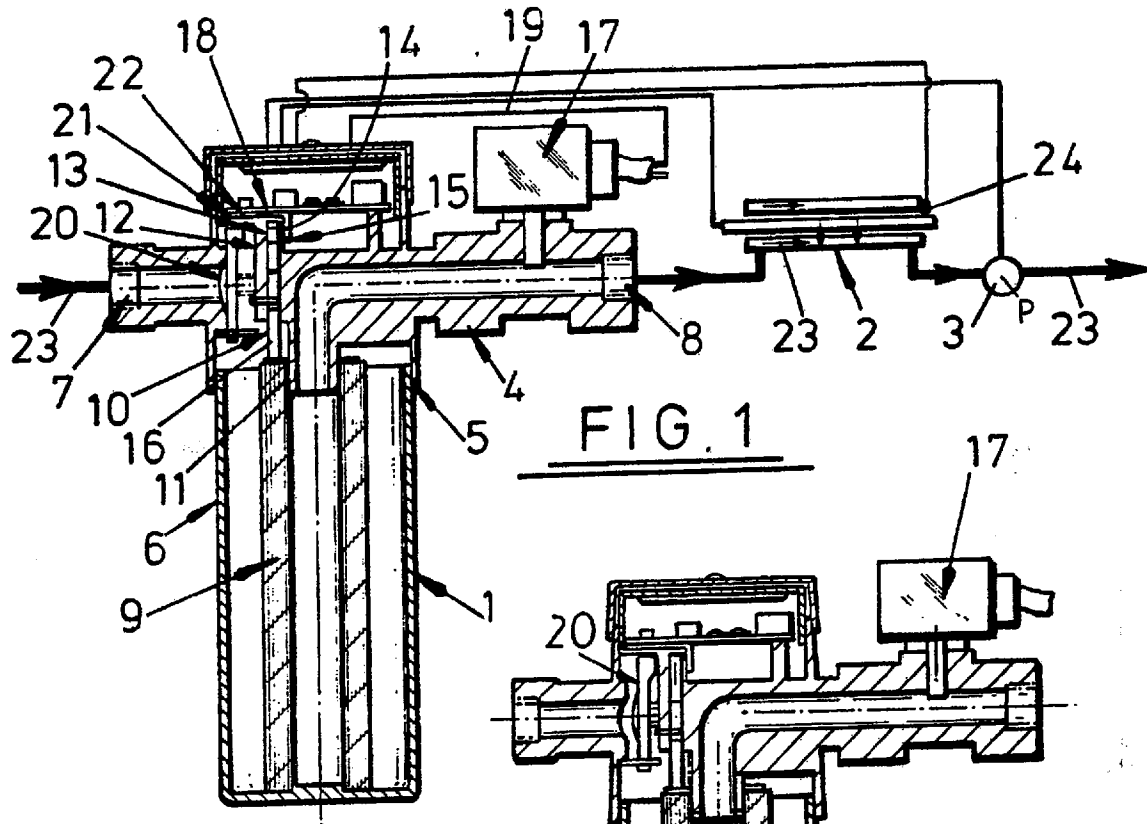


FIG. 1

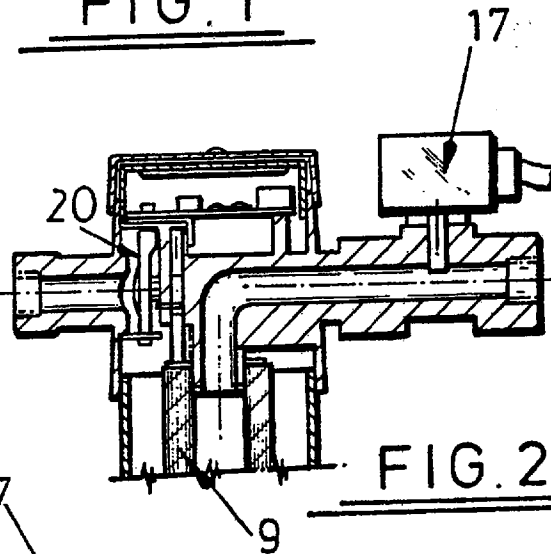


FIG. 2

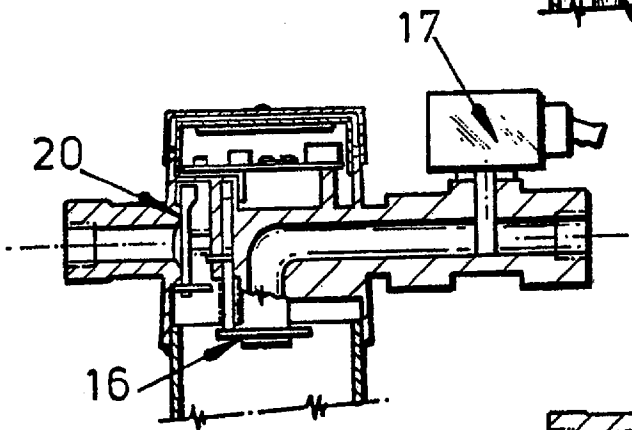


FIG. 3

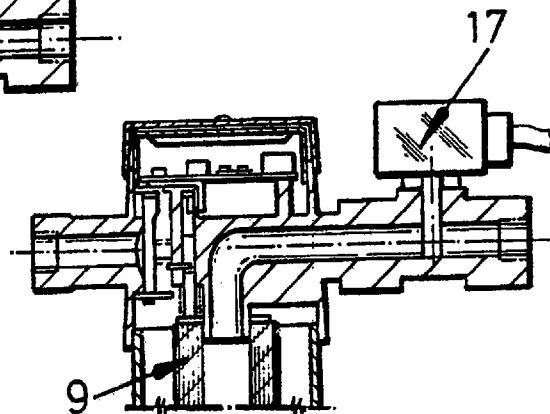


FIG. 4

WATER TREATMENT

The present invention relates to water treatment and in particular to the provision of effective and reliable treatment of water for human consumption.

Whilst various means are known for the treatment of water in order to make it safe for human consumption including for example filtration and UV irradiation, systems employing such means are nevertheless still subject to human error and situations can arise where for example a filter element has been removed for cleaning or replacement and the system has been allowed to continue passing water without the user being aware that the treatment system has been rendered inoperative as a result of failure to replace the element.

It is an object of the present invention to avoid or minimise one or more of the above disadvantages.

The present invention provides a water treatment device comprising a body having a filter chamber for mounting a filter element between an inlet and an outlet of said chamber, and a stop valve means disposable, in use of the device, in series with said filter chamber, said filter chamber having a filter element sensing means formed and arranged so as to be operatively linked to said stop valve means so as to permit opening of said stop valve means only in the presence of a correctly fitted filter element in said filter chamber.

Thus with a treatment system of the present invention it is substantially impossible inadvertently to draw

water which has not been subject to filtration.

Various forms of filter sensing means may be used in the device of the present invention. Conveniently the sensing means is in the form of a filter element engagement member formed and arranged so as to be displaceable by a correctly fitted filter from a stop valve inactivating position to a stop valve activating position. Desirably the engagement member is coupled to a stop valve operating means through a valve chamber wall by non-invasive means, for example, by means of a magnetic coupling between at least one magnetic element and a further magnetic element or a magnetisable element.

Conveniently the stop valve means is in the form of an electrically operated normally-closed valve means and the filter element sensing means is in the form of an engagement member mounting a magnetic element and a microswitch means mounted on the remote, dry, side of a filter chamber wall for controlling, in use of the system, a power supply to said stop valve means which is conveniently in the form of a solenoid valve.

Advantageously the system also includes a non-return valve mounted at or in proximity to said inlet and having an indicator means formed and arranged for allowing actuation of a power operated water treatment and/or pumping means only in the open position of said non-return valve corresponding to a flow of water through said device. Conveniently the indicator means is formed generally similarly to the filter element engagement

means and arranged so as to activate UV irradiation means upon flow of water through the system.

Further preferred features and advantages of the present invention will appear from the following detailed description given by way of example of a preferred embodiment illustrated with reference to the accompanying drawings in which:

Fig. 1 is a part-schematic and partly sectional side elevation of a water treatment device of the invention; and

Fig. 2 to 4 are corresponding detail views illustrating different operating positions of the various parts of the device of Fig.1.

Fig. 1 shows a water treatment supply system comprising a filter device of the present invention 1, a UV irradiation device 2, and a pump 3. In more detail, the filter device 1 comprises a body 4 with a detachable, screw fitting 5, filter chamber casing 6, an inlet 7 and an outlet 8. The body 5 is formed so as to mount a replaceable filter element 9 in line between inlet 7 and outlet 8.

A filter element sensing means in the form of an elongate filter engagement member 10 is slidably mounted in the body 4 adjacent to the upstream end 11 of the outlet means 8, onto which end 11, the filter element 9 is a push fit. At its distant end 12, the filter engagement member 10 has inset a magnetic element 13.

On the remote, "dry" side of an adjacent portion of the filter chamber wall 14 is mounted a micro switch means in the form of a reed switch or the like 15. The engagement member 10 is formed and arranged so as to be slidably displaceable from a lowered position (as viewed in Fig. 1 - see Fig. 3) in the absence of a filter element 9, upwardly by a filter element 11 engaging and driving upwardly the lower end 16 of the engagement member 10 to an activating position (as shown in Figs. 1, 2 and 4), closing the micro switch means 15 to allow opening of a stop valve means 17 which is of a normally closed electrically operated type.

In more detail, the stop valve means 17 is in the form of a solenoid valve which is normally closed when power is not supplied to it whether this be due to a power failure (see Fig. 4) or due to operation of the control circuit 18 to which it is connected, 19. The first micro switch means 15 is connected to the control circuit 18 so as to open the solenoid valve 17 only in the upper, filter element sensing, position of the filter element engagement member 10.

The inlet 7 is also provided with a non-return valve member 20 which has an inset magnetic element 21 formed and arranged for closing a second micro switch means 22 on the remote, dry side of the filter chamber wall 14 in the open position of the non-return valve member 20

(see Fig. 2). The second micro switch means 22 is formed and arranged in the control circuit 18 so as to activate the UV irradiation device 2 and the water pump 3 provided for boosting the water pressure in the supply, only when there is a flow of water 23 through the system.

Thus it will be apparent from the above that on the one hand, it is impossible to draw off water from the system in the absence of a filter element (see Fig. 3) and on the other hand, the UV irradiation device 2 and the pump 3 cannot be activated in the absence of a water flow, e.g. as a result of the absence of a filter element (Fig.3). If desired, further safety means may be provided in the form of a UV lamp failure sensor 24 connected to the control circuit 18 so as to inhibit opening of the solenoid valve 17 upon detection of a lamp failure condition.

CLAIMS

1. A water treatment device comprising a
body having a filter chamber for mounting a filter
element between an inlet and an outlet of said chamber,
and a stop valve means disposable, in use of the device,
5 in series with said filter chamber, said filter chamber
having a filter element sensing means formed and arranged
so as to be operatively linked to said stop valve means so
as to permit opening of said stop valve means only in the
presence of a correctly fitted filter element in said
10 filter chamber.

2. A device as claimed in claim 1 wherein the sensing
means is in the form of a filter element engagement
member formed and arranged so as to be displacable by a
correctly fitted filter from a stop valve inactivating
15 position to a stop valve activating position.

3. A device as claimed in claim 2 wherein the engage-
ment member is coupled to a stop valve operating means
through a valve chamber wall by non-invasive means.

4. A device as claimed in claim 3 wherein the engagement
20 member is coupled to a stop valve operating means
through a magnetic coupling between at least one
magnetic element and a further magnetic element or a
magnetisable element.

5. A device as claimed in any one of claims 1 to
25 : 4 wherein the stop valve means is in the form of an
electrically operated normally-closed valve means

and the filter element sensing means is in the form of an engagement member mounting a magnetic element and a microswitch means mounted on the remote, dry, side of a filter chamber wall for controlling, in use of the system, a power supply to said stop valve means.

6. A device as claimed in any one of claims 1 to 5 wherein the stop valve means is in the form of a solenoid valve.

7. A device as claimed in any one of claims 1 to 6 which device includes a non-return valve mounted at or in proximity to said inlet and having an indicator means formed and arranged for allowing actuation of a power operated water treatment and/or pumping means only in the open position of said non-return valve corresponding to a flow of water through said device.

8. A device as claimed in claim 7 wherein the indicator means is formed generally similarly to the filter element engagement means and is arranged so as to activate a U.V. irradiation means disposed for irradiation of a said flow of water when a correctly fitted filter element is present and said stop valve means is open.

9. A water treatment device substantially as described hereinbefore with particular reference to the accompanying drawings.

